5. (New) A method to manufacture a lead-free Sn-Zn-Bi-Ge-Cu solder material, the method comprising:

presenting a Sn-Zn-Bi alloy;

adding both Ge and Cu having Cu mixture wt.% to the Sn-Zn-Bi alloy so that Cu coexists with Ge in a resulting mixture to facilitate uptake of Ge in a molten composition; and

forming the molten composition from the resulting mixture,

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wherein the Ge in the molten composition defines a predetermined Ge molten composition wt.%, wherein the Cu mixture wt.% is a function of the predetermined Ge molten composition wt.%, and wherein the molten composition exhibits good wettability as a whole.

6. (New) The method of claim 5, wherein adding both Ge and Cu to the Sn-Zn-Bi alloy consists of adding both Ge and Cu to the Sn-Zn-Bi alloy to shorten a zero cross time Tb.

7. (New) The method of claim 5, wherein adding Ge to the Sn-Zn-Bi alloy and adding Cu to the Sn-Zn-Bi alloy comprise simultaneously adding Ge and CU to the Sn-Zn-Bi alloy prior to beginning the formation of the molten composition.

8. (New) The method of claim 5, wherein the Sn-Zn-Bi-Ge-Cu composition approximately contains 0.5 to 10 wt.% of Zn, 0.5 to 8 wt.% of Bi, 0.005 to 0.05 wt.% of Ge, and 0.3 to 3 wt.% of Cu, with the balance being substantially Sn.

9. (New) The method of claim 8, further comprising:

measuring a molten solder sample of the Sn-Zn-Bi-Ge-Cu composition to verify that the Sn-Zn-Bi-Ge-Cu composition approximately contains 0.5 to 10 wt.% of Zn, 0.5 to 8 wt.%

of Bi, 0.005 to 0.05 wt.% of Ge, and 0.3 to 3 wt.% of Cu, with the balance being substantially Sn.

10. (New) The method of claim 9, wherein measuring the molten solder sample comprises employing Inductively Coupled Plasma Atomic Emission Spectrometer analysis.

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11. (New) The method of claim 8, wherein the Sn-Zn-Bi-Ge-Cu composition consists of 0.5 to 5 wt.% of Zn.

12. (New) The method of claim 8, wherein the Sn-Zn-Bi-Ge-Cu composition consists of 5 to 8 wt.% of Bi.

13. (New) The method of claim 8, wherein the Sn-Zn-Bi-Ge-Cu composition consists of less than 80% of Sn.

14. (New) The method of claim 8, wherein the Sn-Zn-Bi-Ge-Cu composition consists of greater than 93.5% of Sn.

15. (New) The method of claim 5, wherein the Cu is added in a Cu mixture wt.% that is insufficient to form an intermetallic compound of Cu and Sn.

16. (New) The method of claim 15, wherein the Sn-Zn-Bi-Ge-Cu composition consists of 1 to 3 wt.% of Cu.

17. (New) The method of claim 5, wherein forming the molten composition comprises maintaining the resulting mixture in a melted state at about 400 degrees Celsius for about two to three hours, the method further comprising:

cooling the molten composition to form a solder ingot; and

measuring the solder ingot by employing Inductively Coupled Plasma Atomic Emission Spectrometer analysis to obtain the composition of the solder ingot.

18. (New) The method of claim 5, wherein the molten composition exhibits good wettability as a whole by exhibiting a short zero cross time Tb and a steep rising gradient for a somewhat poor wet force F_2.

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19. (New) A method to manufacture a lead-free Sn-Bi-Ag-Ge-Cu solder material, the method comprising:

presenting a Sn-Bi-Ag alloy;

adding both Ge and Cu having Cu mixture wt.% to the Sn-Bi-Ag alloy so that Cu coexists with Ge in a resulting mixture to facilitate uptake of Ge in a molten composition; and

forming the molten composition from the resulting mixture,

wherein the Ge in the molten composition defines a predetermined Ge molten composition wt.%, wherein the Cu mixture wt.% is a function of the predetermined Ge molten composition wt.%, and wherein the molten composition exhibits good wettability as a whole.

20. (New) The method of claim 19, wherein adding both Ge and Cu to the Sn-Bi-Ag alloy consists of adding both Ge and Cu to the Sn-Bi-Ag alloy to shorten a zero cross time Tb.

21. (New) The method of claim 19, wherein adding Ge to the Sn-Bi-Ag alloy and adding Cu to the Sn-Bi-Ag alloy comprise simultaneously adding Ge and CU to the Sn-Bi-Ag alloy prior to beginning the formation of the molten composition.

22. (New) The method of claim 19, wherein the Sn-Bi-Ag-Ge-Cu composition approximately contains 0.5 to 8 wt.% of Bi, 0.5 to 3 wt.% of Ag, 0.01 to 0.1 wt.% of Ge, 0.3 to 1 wt.% of Cu, with the balance being substantially Sn.

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23. (New) The method of claim 22, further comprising:

measuring a molten solder sample of the Sn-Bi-Ag-Ge-Cu composition to verify that the Sn-Bi-Ag-Ge-Cu composition approximately 0.5 to 8 wt.% of Bi, 0.5 to 3 wt.% of Ag, 0.01 to 0.1 wt.% of Ge, 0.3 to 1 wt.% of Cu, with the balance being substantially Sn.

24. (New) The method of claim 23, wherein measuring the molten solder sample comprises employing Inductively Coupled Plasma Atomic Emission Spectrometer analysis.

25. (New) The method of claim 22, wherein the Sn-Bi-Ag-Ge-Cu composition consists of 0.5 wt.% of Bi.

26. (New) The method of claim 22, wherein the Sn-Bi-Ag-Ge-Cu composition consists of not more than 0.4 wt.% of Cu.

27. (New) The method of claim 19, wherein the Cu is added in a Cu mixture wt.% that is insufficient to form an intermetallic compound of Cu and Sn.

28. (New) The method of claim 27, wherein the Sn-Bi-Ag-Ge-Cu composition consists of not more than 0.4 wt.% of Cu.

29. (New) The method of claim 27, wherein the Sn-Bi-Ag-Ge-Cu composition consists of 0.3 to 0.4 wt.% of Cu.

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30. (New) The method of claim 19, wherein forming the molten composition comprises maintaining the resulting mixture in a melted state at about 400 degrees Celsius for about two to three hours, the method further comprising:

cooling the molten composition to form a solder ingot; and

measuring the solder ingot by employing Inductively Coupled Plasma Atomic Emission Spectrometer analysis to obtain the composition of the solder ingot.

31. (New) The method of claim 19, wherein the molten composition exhibits good wettability as a whole by exhibiting a short zero cross time Tb and a steep rising gradient for a large wet force F_2.

32. (New) A method to manufacture a lead-free Sn-Zn-In-Ge-Ag solder material, the method comprising:

presenting a Sn-Zn-In alloy;

adding both Ge and Ag having Ag mixture wt.% to the Sn-Zn-In alloy so that Ag coexists with Ge in a resulting mixture to facilitate uptake of Ge in a molten composition; and

forming the molten composition from the resulting mixture,

wherein the Ge in the molten composition defines a predetermined Ge molten composition wt.%, wherein the Ag mixture wt.% is a function of the predetermined Ge

molten composition wt.%, and wherein the molten composition exhibits good wettability as a whole.

33. (New) The method of claim 32, wherein adding both Ge and Ag to the Sn-Zn-In alloy consists of adding both Ge and Ag to the Sn-Zn-In alloy to shorten a zero cross time Tb.

34. (New) The method of claim 32, wherein adding Ge to the Sn-Zn-In alloy and adding Ag to the Sn-Zn-In alloy comprise simultaneously adding Ge and AG to the Sn-Zn-In alloy prior to beginning the formation of the molten composition.

35. (New) The method of claim 32, wherein the Sn-Zn-In-Ge-Ag composition approximately contains 3 to 15 wt.% of Zn, 3 to 10 wt.% of In, 0.01 to 0.3 wt.% of Ge, and 0.3 to 3 wt.% of Ag, with the balance being substantially Sn.

36. (New) The method of claim 35, further comprising:

measuring a molten solder sample of the Sn-Zn-In-Ge-Ag composition to verify that the Sn-Zn-In-Ge-Ag composition approximately contains 3 to 15 wt.% of Zn, 3 to 10 wt.% of In, 0.01 to 0.3 wt.% of Ge, and 0.3 to 3 wt.% of Ag, with the balance being substantially Sn.

37. (New) The method of claim 36, wherein measuring the molten solder sample comprises employing Inductively Coupled Plasma Atomic Emission Spectrometer analysis.

38. (New) The method of claim 35, wherein the Sn-Zn-In-Ge-Ag composition consists of 3 to 5 wt.% of Zn.

39. (New) The method of claim 35, wherein the Sn-Zn-In-Ge-Ag composition consists of 3 wt.% of In.

40. (New) The method of claim 35, wherein the Sn-Zn-In-Ge-Ag composition consists of .3 wt.% of Ag.

41. (New) The method of claim 32, wherein the Ag is added in an Ag mixture wt.% that is insufficient to form an intermetallic compound of Ag and Sn.

42. (New) The method of claim 41, wherein the Sn-Zn-In-Ge-Ag composition consists of .3 wt.% of Ag.

43. (New) The method of claim 32, wherein forming the molten composition comprises maintaining the resulting mixture in a melted state at about 400 degrees Celsius for about two to three hours, the method further comprising:

cooling the molten composition to form a solder ingot; and

measuring the solder ingot by employing Inductively Coupled Plasma Atomic Emission Spectrometer analysis to obtain the composition of the solder ingot.

44. (New) The method of claim 32, wherein the molten composition exhibits good wettability as a whole by exhibiting a short zero cross time Tb and a steep rising gradient for a somewhat poor wet force F_2.